CEILING MOUNTED RACK

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Background of the Invention

This invention relates to a rack which is mounted typically from a rafter, which may also hold a solid ceiling, or may be open. The rack is made of a mesh of stiff wires, and may comprise a group of modular units which may be secured together to provide a rack or racks of varying size. The entire rack system may be pre-assembled and lifted for easy installation into pre-installed attachment members. The system is very flexible and forgiving as to the spacing of the pre-installed attachment members. Also, the system will tend to move rather than break if it is bumped, since it is held from vertically mounted hanger wires which may rotate to a certain extent with respect to the rack, permitting the rack to swing rather than break. The rack system is inexpensive, and capable of holding large loads.

Description of the Invention

This invention relates to a rack which comprises at least one wire mesh panel which, in turn, comprises a first array of parallel wires and a second array of parallel wires, both of the wire arrays being relatively stiff. The wires of the first and second arrays are in transverse, angular relation, being bonded to each other at at least a substantial number of wire crossing points, by welding or the like.

The wire mesh panel defines opposed, parallel side edges which are substantially defined by first individual wires of the first array. Third wires are respectively bonded to the panel, being positioned parallel to and adjacent to the first individual wires of the first array, i.e., those individual wires that define the opposed, parallel side edges. The third wires are spaced from the first individual wires by crossing wires of the second array.

Thus, the opposed, parallel side edges of the wire mesh panel which comprises the rack are generally defined by a pair of parallel wires comprising a first individual wire and a third wire, separated by the second array of wires, typically the ends of the wires of the second array.

Often, a plurality of the wire mesh panels described above may be connected together along their opposed parallel side edges by a plurality of clamp members. These clamp members respectively enclose the first individual wires of the first array and the adjacent third wires, to provide extra strength to the connection. The clamp members may retain a hanger wire, which hanger wire is positioned below the wires of the second array, parallel to the wires of the first array. The hanger wire extends substantially the length of the wire mesh panel, parallel to the opposed, parallel side edges. Each end of the hanger wire preferably defines a transversely extending wire portion terminating in a hanger hook, to permit hanging from a ceiling, typically a rafter which defines the ceiling and may also support a solid, horizontal ceiling if desired. Preferably, several such hanger wires are present, one on each side of the wire mesh panel or preferably an array of connected wire mesh panels.

It is also preferable for the clamp members to each comprise a first member which is substantially U-shaped in cross section, and a separate, second member which is substantially S-shaped in cross section. The first and second members are bolted together. Each of the S-shaped members defines a trough which receives a hanger wire, described above, in a position below the wires of the second array and parallel to the wires of the first array. Thus, each of the hanger wires may support the wires of the second array from the bottom if desired. Alternatively, heads of the bolts which hold the first and second members of the clamp member together may engage and prevent the hanger wire members from rising out of the trough when the wire mesh rack is supported by the hanger members. Also, the clamp

members may surround and secure a pair of the opposed, parallel side edges of adjacent wire mesh panels, thus enclosing a first individual wire and a third wire of each of the panels for strong securence together of the respective wire mesh panels, to form a modular rack comprising two or more of such wire mesh panels connected together.

Thus the vertically mounted rack of this invention can be hung from brackets on rafters, or other elevated sites, being quite forgiving relative as to precise spacing of the brackets, and being capable of a measure of movement if bumped so that the rack swings rather than breaking in such a circumstance. This provides a new and useful rack for garages, workshops, and other indoor areas for added storage space, while the rack is relatively light and of simple, inexpensive construction, as well as being of variable size.

Description of the Drawings

In the drawings, Figure 1 is a perspective view of one embodiment of a rack of this invention, comprising four connected wire mesh panels, with certain portions eliminated for clarity.

Figure 2 is an enlarged, fragmentary perspective view of a portion of the rack of Fig. 1, as indicated in Fig. 1.

Fig. 3 is a simplified, fragmentary vertical section showing pairs of first and second individual wires and third wires of respective parallel side edges of two wire mesh panels, enclosed by the clamp member of this invention.

Fig. 4 is a fragmentary side elevational view of the structure of Fig. 2, taken from the right side as shown in Fig. 2.

Description of Specific Embodiments

Referring to the drawings, a modular rack 10 is shown, being made up of several wire mesh panels 12, which are secured together at respective opposed, parallel side edges 14.

Each wire mesh panel comprises a first array of parallel wires 16 and a second array of parallel wires 18. The respective wires of the first and second arrays 16, 18 are seen to be substantially perpendicular to each other, although, if desired, other angles such as 45° or 60° may be used. The wires of the respective first and second arrays 16, 18 may be bonded to each other by conventional welding at least at a substantial number of wire crossing points.

The respective wires of arrays 16, 18, have a diameter, for example, of about a quarter inch each, to be stiff and strong.

In accordance with this invention, third wires 20 are respectively bonded to the panel at crossing second wires 18, the third wires being positioned parallel to and adjacent to the first individual wires 16a of the first array, being typically positioned at the edge of each panel along with first individual wires 16a of the first array. This defines the side edges 14 along with third wires 20 in this embodiment. This can be seen in Fig. 3, for example, in which the opposed, parallel side edges of joined panels are defined by a first individual wire 16a of the panel's first array 16 and a parallel third wire 20, the respective wires 16a, 20 being separated by the crossing wires of the second wire array 18.

The respective wire mesh panels 12 are connected together in this manner along the opposed parallel side edges defined by wires 16a, 20 by several spaced clamp members 22, which hold the respective panels together, enclosing respective third wires 20 and first individual wires 16a of the pair of wire mesh panels together in the clamp 22 in a generally rectangular array, with each of the wires 20 of adjacent panels being separated from wires 16a by the perpendicular wires of the second array 18. This provides a strong, secure connection between the respective wire mesh panels 12, with the panel edges defined by wires 20, 16a having substantially increased strength because of the extra wire 20.

Each of the respective clamp members 22 comprise a first member 24 which is substantially U-shaped in cross section (Fig. 2) and a second member 26, which is substantially S-shaped in cross section, with one end being extended parallel to the central portion of the S-shaped cross section so that the extended end 28 defines a trough 30. First and second members 24, 26 are bolted together with bolts 32 into the configuration as shown in Fig. 2. In this configuration, the respective sides of two wire mesh panels are held together by the clamping of their respective first individual wires 16a and the third wires 20, the wires being held in a cross-sectional rectangular array, with wires 20 being spaced from wires 16a by the wires of second array 18.

Trough 30, defined by S-shaped second member 26, carries a horizontal portion 34a of a hanger wire 34 in a position below the wires of second array 18. The section of hanger wire 34 which occupies trough 30 is parallel to the wires of first array 16, 16a.

Each of hanger wires 34 carries a hook 38 at its outer end, which hook can engage an aperture 40 of a bracket 42, which bracket may be mounted on a rafter or other solid site for mounting above the rack 12. While not shown for clarity, each of hooks 38 may connect to a separate attached bracket 42, which brackets may be mounted by screws 46 in a conventional manner. Because of the inherent flexibility of hanger wires 34, the placement of brackets 40 along a rafter or other attachment site is not very critical, so that the rack 12 of this invention can be easily installed. Also, if rack 12 is struck by the top of a moving vehicle, its tendency is more to swing and bend rather than to break, while retaining the load carried on the rack.

The horizontal section 34a of hanger wire 34 may rest underneath the wires of second array 18 in load carrying manner. Alternatively, the heads of bolts 32 and the width of extended portion 28 of second clamp section 26 may retain the horizontal portions 34a of

hanger wires 34 in spaced relation from second wire array 18, if desired, and either way, strong load-bearing characteristics can be achieved.

The respective side edges 48 of rack 12 will normally also be secured by clamp members 22 with an attached, retained hanger wire 34. But this structure is not shown for clarity of disclosure, so that the structure and relationship of wires 16a, 18, 20 can be clearly seen.

Thus, a modular rack 12 is disclosed, which may comprise one or any plural number of connected wire mesh panels 12, having attached hanger wires which may be connected at their outer ends through hooks 38 or the like to an upper attachment point, such as a ceiling, which term is intended to include open rafters or any other upper surface under a roof. The modular rack is inexpensive, very strong, easy to install, and resistant to damage by collision with the top of a moving vehicle or the like.

The above has been offered for illustrative purposes only, and is not intended to limit the scope of the invention of this application, which is as described in the claims below.